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CLAIMS

1/ A method of automatically laying out pieces to be cut out from remnants of flexible material having non-uniform characteristics, and to be used for making articles, said method being characterized in that it comprises the steps consisting in:

establishing, for remnants of a determined type, at least one mask whose area is subdivided into various zones which correspond to different value levels of a characteristic of the material of the remnant;

assigning a set of constraints to at least some of the component pieces of a determined type of article, which set of constraints includes at least one value constraint for a characteristic of the material of the remnant;

defining links between at least some of the component pieces, which links have different levels as a function in particular of relationships imposed between constraints assigned to the pieces;

digitizing each remnant in order to obtain an image; applying to the image of each remnant the mask or each mask corresponding to the type of the remnant by performing dimension matching so as to subdivide the image of the remnant into various zones having uniform characteristics; and

laying out automatically by disposing the pieces in the zones of the image of the remnant as a function of any constraints assigned to the pieces, and in compliance with the links defined between the pieces.

2/ A method according to claim 1, characterized in that, for a remnant of a determined type, at least one mask is established chosen from:

a mask comprising zones having different values for the color shade of the material; and

a mask comprising zones having different values for a surface appearance characteristic of the material.

3/ A method according to claim 2 for automatically laying out pieces to be cut out from hides so as to be used to make articles of leather, said method being characterized in that a mask is established that comprises zones having different values for the grain of the leather.

4/ A method according to ~~any one of claims 1 to 3,~~^{Claim 1} characterized in that a mask is applied to the image of a remnant by causing reference axes respectively associated with the mask and with the remnant to coincide.

5/ A method according to claim 4 for automatically laying out pieces to be cut out from hides so as to be used to make articles of leather, said method being characterized in that an axis corresponding to the backbone of the animal from which the hide is taken is used as the reference axis.

6/ A method according to claim 4 ~~or 5,~~ characterized in that the reference axis is determined by indicating or marking it manually on the remnant.

7/ A method according to claim 4 ~~or 5,~~ characterized in that the reference axis is determined by analyzing the image of the digitized remnant.

8/ A method according to ~~any one of claims 1 to 7,~~^{Claim 1} characterized in that at least some of the component pieces of a determined type of article are distributed into groups, and any links between the groups and between groups and pieces are defined.

9/ A method according to claim 8, characterized in that at least some pieces are distributed into functional groups, each of which comprises the component pieces(s) of a sub-assembly of the article.

Claim 1
 10/ A method according to ~~any one of claims 1 to 9,~~
 characterized in that at least some pieces are assigned
 one or more constraints chosen from:

- 5 a value level for the color shade of the material;
 a value level for a surface state characteristic of
 the material; and
 a preferential angular position relative to a
 reference axis of the remnant.

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11/ A method according to claim 10, characterized in that
 at least some pieces are assigned a preferential angular
 position constraint relative to a reference axis of the
 remnant, and are associated with angular position
 15 tolerance data corresponding to a maximum allowed angle
 of rotation relative to the preferential angular
 position.

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Claim 1
 12/ A method according to ~~any one of claims 1 to 11,~~
 characterized in that links are defined¹ between at least
 some pieces, which links have different levels as a
 function of proximity constraints assigned to the pieces.

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13/ A method according to claim 12, characterized in that
 the proximity constraints between two pieces are
 expressed in the form of a maximum distance between two
 characteristic points on the pieces, or in the form of a
 maximum difference between values levels of one or more
 characteristics of the material of the remnant.

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Claim 1
 14/ A method according to ~~any one of claims 1 to 13,~~
 characterized in that, for a remnant¹ of a determined
 type, a possible coefficient of stretching of the
 material in at least one determined direction relative to
 35 a reference axis of the remnant is defined, and the
 layout is defined by optionally using the defined
 stretching capacity.

a 15/ A method according to ~~any one of claims 1 to 14,~~ ^{Claim 1}
characterized in that at least some pieces or groups of
pieces are assigned respective layout priority levels,
5 and the laying out is performed in order of decreasing
priority.

16/ A method according to claim 15, characterized in
that, the higher the level of link between a piece or a
10 group of pieces and another piece or group, the higher
the priority level assigned to the piece or group of
pieces.

a 17/ A method according to ~~any one of claims 1 to 16,~~ ^{Claim 1}
15 characterized in that any flaws on each remnant are
detected, and each detected flaw is associated with data
representing one of a plurality of predetermined degrees
of seriousness, and flaw information is stored comprising
data indicating the locations of the flaws on the remnant
20 and the associated data indicating the levels of
seriousness.

18/ A method according to claim 17, characterized in that
each of the component pieces of a determined type of
25 article is associated with information representing the
degree of flaw seriousness tolerated by said piece.